

# When People Want What Others Have: The Impulsive Side of Envious Desire

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Envy is the unpleasant emotion that can arise when people are exposed to others with superior possessions. Common wisdom and scholarly opinion suggest that when people experience envy they may be motivated to obtain the others' superior possession. Despite the vast interpersonal, societal, and economical consequences attributed to this potential aspect of envious responding, experimental demonstrations of the affective and behavioral consequences of envy-inducing situations are scarce. We propose that social comparisons with better-off others trigger an impulsive envious response that entails a behavioral tendency to strive for their superior good. However, given that the experience of envy is painful, self-threatening, and met with social disapproval, people typically attempt to control their envious reactions. Doing so requires self-control capacities, so that envious reactions may only become apparent if self-control is taxed. In line with these predictions, four experiments show that only when self-control resources are taxed, upward comparisons elicit envy paired with an increased willingness to pay for, to spontaneously purchase and to impulsively approach the superior good.

*Keywords:* envy, social comparison, self-control, impulsive behavior, approach and avoidance

Whether it is a colleague's fancy apartment, a neighbor's expensive car, an acquaintance's stylish shoes, a friend's new smart phone, or the delicious ice cream of a passer-by—we often find ourselves in situations in which we lack the superior fortunes that others possess. Undoubtedly, modern societies provide abundant opportunities to compare our own possessions to those of other people. Global marketing campaigns try to shape our aspirations and desires, for example, by presenting upward comparison standards (Belk, 2008; Richins, 1995). In doing so, they also render other people's superior material possessions particularly visible and recognizable. Envy is the unpleasant emotion that may arise from comparisons with such superior standards.

How do people maneuver through the multitude of potentially envy-eliciting situations? How does envy influence behavior? Numerous scholars have argued that being aware of someone with a superior good prompts us to try to obtain this good (Aristotle, trans. 1929; Foster, 1972; Girard, 2001; Hill & Buss, 2008). Furthermore, they suggest that this behavioral tendency lies at the heart of the vast interpersonal, societal, and economic conse-

quences of envy (Foster, 1972; Girard, 2001; Schoeck, 1969). Importantly, envy-induced striving is believed to change human behavior for the better and for the worse. On the negative side, the biblical tenth commandment—"You shall not covet your neighbor's house"—warns about the potentially dark side of being motivated by envy. On the positive side, scholars have also speculated that behavior spurred by the awareness of others' greater fortunes may be a source of innovation (Barnett, 1953) and economic growth (Corneo & Jeanne, 2001). What is clear from these different perspectives is that envy might influence human behavior in a multifaceted way. Despite its important implications, experimental demonstrations of the behavioral consequences of envious desire are scarce.

The present paper seeks to reduce this empirical gap. To do so, we will provide the first experimental evidence demonstrating that spontaneous social comparisons with better-off others can elicit envy entailing an increased tendency to strive for their superior goods. In addition, we will set out to provide experimental evidence for potential boundary conditions and underlying psychological mechanisms of envy. More specifically, we hypothesize that because the experience of envy is painful and its expression violates social norms, envious reactions primarily arise in situations in which physiological or cognitive constraints limit people's ability to exert self-control. To examine this possibility we provoked envy under constrained or unconstrained self-control capacity. We did so by letting some participants face another person who tastes a more likable food. We then assessed how these unfavorable social comparisons influence the level of envy that participants report, the extent to which they strive for the superior product as well as their willingness to buy it. Furthermore, to shed additional light on the underlying psychological mechanism, we examined whether envy induces the impulsive motivational tendency to approach a desired product.

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### Wanting What the Other Has

Envy is usually portrayed as a complex and multifaceted emotion that follows from an upward social comparison and results in a variety of thoughts and feelings, such as a sense of inferiority, discontent and frustration, anger, or even ill will (Miceli & Castelfranchi, 2007; Smith & Kim, 2007). Despite its multifaceted nature, however, a common phenomenological component of many envy experiences is desire. When people are asked to describe an episode of strong envy, the most prototypical element is the wish to have what another person has (Parrott & Smith, 1993; Smith, Kim, & Parrott, 1988). Furthermore, when asked to remember an incident in which another person had a superior fortune, experienced envy is correlated with desire (Ackerman, MacInnis, & Folkes, 2000).

Such an intense desire may be especially prevalent in a type of envy that has been characterized as benign, as it lacks the hostility evoked by its malicious counterpart (Van de Ven, Zeelenberg, & Pieters, 2009). Even though both types of envy are experienced as painful and frustrating, give rise to high levels of felt inferiority and cause people to be equally ashamed of their thoughts, they involve different motivations: Whereas malicious envy is primarily associated with a motivation to tear others down, benign envy is predominantly associated with a motivation to build oneself up (Van de Ven et al., 2009).

It thus seems evident that wanting to have what another person possesses can be a central element of envy. Envy episodes, benign ones in particular, are closely intertwined with desire. An obvious reason for this link might be that desire is a precondition for envy to occur: According to this view, we typically envy others who possess things that we want to have ourselves (Smith & Kim, 2007). A different possibility, however, is that we are motivated to acquire a good because another person possesses it. Envy may thus not just be a product of desire, it may *intensify* our effort to attain others' superior possessions. In other words, the action tendency (Frijda, 1986) of envy might be to gain the advantage that is enjoyed by the envied other.

In fact, this possibility can be derived from a variety of different theoretical perspectives, tracing back to the Ancient Greek philosophers. Aristotle (trans. 1929) was the first to argue that painful, emulative envy encourages people to try hard to attain the good things their neighbors have. Many modern scholars have built on this idea (Belk, 2008; Heider, 1958; Hill & Buss, 2008; Rawls, 1971). For example, from an evolutionary perspective, it has been argued that envy is an emotional adaptation that alerts people to strategic interference by better-off others and motivates them to acquire resources that ensure their competitive fitness (Hill & Buss, 2008). Thus, part of an envious reaction may be the motivation to acquire the superior good. On the basis of this idea, we contend that being confronted with someone having a superior possession can cause an increased behavioral tendency to strive for the superior good, over and above the behavioral inclination evident in a similar situation that does not evoke envy.

### Envious Behavior: Impulse and Self-Control

How prevalent is envy likely to be? Are people constantly at the mercy of their envious reactions? In fact, a strong argument can be made for the ubiquity and the impulsivity of envious reactions. The

starting point of envy is an unfavorable social comparison. Comparisons with other people are a ubiquitous and highly efficient element of human cognition (Mussweiler, 2003; Mussweiler & Epstude, 2009; Suls & Wheeler, 2000). For example, when judging another person, people spontaneously compare this person to themselves (Dunning & Hayes, 1996). Similarly, when judging themselves, people spontaneously compare themselves to other people (Mussweiler & Rüter, 2003). The human proclivity to engage in comparison is so pervasive that people involuntarily compare with others who are clearly not relevant comparison standards, and they have to exert mental effort to undo the psychological consequences of such inappropriate comparison (Gilbert, Giesler, & Morris, 1995). Thus, while we may often engage in deliberate comparisons, much social comparison activity occurs without intention (Mussweiler, Rüter, & Epstude, 2004). Consequently, a comparison with another person who possesses a superior good may trigger envious discontent and envious behavioral tendency in an automatic fashion, without cognitive effort or intention. In summary, this reasoning suggests that envy may well be a spontaneous and automatic reaction. People may indeed be at the mercy of their envy-fueled impulses.

At the same time, however, people may often be motivated to counteract and control their envious reactions. Because expressing envy violates social norms (Foster, 1972; Heider, 1958; Silver & Sabini, 1978), and because experiencing envy is not only painful (Takahashi et al., 2009) but also threatening to the positive self-views that people strive to maintain (Tesser, 1988), people are likely not only to spontaneously deny envy and suppress overt envious behavior but also to alter their inner thoughts and feelings (Smith & Kim, 2007). In line with this view, neuroimaging studies have shown activation of brain areas related to emotional control when confronted with superior others (Joseph, Powell, Johnson, & Kedia, 2008).

Deliberate regulation of emotional reactions can be achieved by a wide variety of strategies. People can, for example, not only avoid exposure to or divert their attention from emotion-evoking stimuli, but can also cognitively reappraise the meaning of these stimuli, or suppress emotional reactions (e.g., Gross, 1998). In light of the fact that being confronted with better-off others is—for most people—likely to be a frequent if not constant experience, people are also likely to be well equipped to deal with the potentially negative consequences of such situations. People are thus likely to be motivated and skilled enough to undo or control their envious impulses.

A growing body of research has identified situational conditions that constrain effective self-regulation and thus influence whether people are successful in altering their emotional reactions and resisting their impulses. Specifically, self-control capacity has been shown to be a resource that can be depleted, such that exerting self-control in one task disrupts people's ability to exert self-control in subsequent tasks (Baumeister, Bratslavsky, Muraven, & Tice, 1998). The exertion of self-control is also hindered by cognitive and physiological factors that limit residual mental capacity, such as performing a difficult memory task, time pressure, low blood sugar level, or alcohol intoxication (for a review, see Hofmann, Friese, & Strack, 2009). For example, Hofmann and Friese (2008) found that for participants who had consumed alcohol, impulsive reactions (implicit attitudes toward a candy) predicted the amount of candy consumption. In contrast,

for sober participants, conscious eating behavior standards predicted how much candy they consumed. Similarly, limiting processing capacity via cognitive load can increase the impact of spontaneously evoked affective responses on behavior (Shiv & Fedorikhin, 1999). In a similar vein, emotion regulation research has shown that successful attempts to alter one's affective reactions can be contingent on cognitive and self-regulatory capacity (e.g., Baumeister et al., 1998; Wegner, Erber, & Zanakos, 1993) and consume cognitive resources (e.g., Richards & Gross, 2000; Sheppes & Meiran, 2008).

Thus, whenever people are exhausted, distracted, intoxicated, or otherwise deprived of their self-regulatory resources, impulses may dictate behavior and successful emotional regulation is less likely. The common element underlying these seemingly disparate factors may be the impairment of executive working memory functions—a precondition for the exertion of self-control (Hofmann et al., 2009). Applying these insights to the phenomenon of envy suggests that envious reactions may surface if self-control resources are impaired. The crucial factor determining whether people will act on their initial envious impulse is thus likely to be whether they are *able* to alter and influence their emotional response.

### The Present Research

In summary, we hypothesize that spontaneous social comparison with another person possessing a superior good triggers an envious emotional response that involves an intensified, impulsive inclination to acquire this good. In light of the fact that envy is painful, self-threatening and met with social disapproval, however, people typically strive to overcome their envious reactions spontaneously. As a result, envious reactions are particularly likely to manifest themselves when the mental resources that are required for successful self-control are constrained.

The present research was designed to submit this reasoning to an experimental test. To do so, we created experimental conditions that provoked envy in the psychological laboratory. More specifically, our participants were asked to taste a given food item and were exposed to another person who was about to taste a more desirable food item. Because people are typically motivated to control their envious impulses, envious reactions should be primarily apparent when resources to exert self-control are constrained. Therefore, in addition to facing a disadvantage in a taste test, for some participants in our experiments, self-control capacity was limited by alcohol or cognitive load. We assessed how these unfavorable social comparisons influenced participants' affective and behavioral reactions. Experiment 1 focuses on affective envious reactions and seeks to demonstrate that participants whose self-control capacities are constrained by alcohol intoxication report more envy when exposed to a better-off other. The subsequent experiments manipulate self-control capacities by using a cognitive load manipulation. With the help of this manipulation, Experiment 2 examines whether being exposed to a better-off other under load not only leads to envy, but also intensifies participants' inclination to obtain the envied good as expressed in an increased willingness to pay. Experiment 3 takes this one step further by examining actual buying behavior. Finally, Experiment 4 sets out to shed more light on the psychological mechanisms that underlie these various effects. More specifically, this final study seeks to

demonstrate that uncontrolled envious reactions involve an impulsive motivational tendency to approach the superior product.

### Experiment 1

In Experiment 1, we examined whether alcohol intoxication influences the expression of envious discontent. A great number of studies have demonstrated that alcohol causes self-control failure and leads to disinhibited responses (Baumeister, Heatherton, & Tice, 1994; Hull & Bond, 1986). Psychopharmacological research shows that alcohol consumption undermines executive functioning in a multitude of ways (Hull & Slone, 2004). For example, alcohol intoxication has been shown to affect the ability to inhibit and alter prepotent responses, while leaving bottom up processes such as the activation and implementation of automatic responses intact (Curtin & Fairchild, 2003; Fillmore & Vogel-Sprott, 1999). Taken together, this research demonstrates that intoxicated people are less likely to successfully exert self-control. In addition, according to psychological explanations of alcohol effects, alcohol consumption can change the perception of social norms, such that people think that it is permissible to violate social norms when being drunk because alcohol itself offers the excuse for doing so (e.g., Marlatt & Rohsenow, 1980). Thus, alcohol not only influences the *ability* but also the *motivation* to exert self-control. In the context of envy, this suggests that people who are exposed to a better-off other are more likely to show envious reactions if they have consumed alcohol.

To recruit participants who varied in their level of alcohol intoxication, we approached passers-by during the climax of the Cologne carnival, which involves alcohol consumption for many revelers. In an ostensible taste test, participants were assigned to taste chewy candy and were simultaneously deprived of a more desirable chocolate. In the better-off neighbor condition, this took place in the immediate presence of a confederate who received the chocolate. In the no-neighbor condition, they did so without the presence of a confederate. Given that participants in this condition knew that other participants might potentially receive the chocolate, they could in principle become envious, too. However, because social comparisons with specific other persons, such as physically present coactors, have a greater psychological impact than unspecific, aggregate comparison information (e.g., Buckingham & Alicke, 2002), we expected envy to be most likely in the better-off neighbor condition, especially for intoxicated participants. To ensure that participants did not feel righteous resentment rather than envy, the assignment to the foods was seemingly random, and thus fair by objective standards (Smith & Kim, 2007; Smith, Parrott, Ozer, & Moniz, 1994).

### Method

**Participants and design.** Participants were 38 adult passers-by during the Cologne street carnival. They were assigned to a better-off neighbor condition or a no-neighbor condition. Measured blood alcohol content (BAC) served as a quasi-experimental variable.

**Procedure.** To select a pair of differentially desirable foods, we asked an independent sample ( $N = 30$ ) how much they would like to eat several foods, on 9-point scales from 1 (*not at all*) and 9 (*very much*). For Experiment 1, we selected "*Choco Crossies*" (a

chocolate confection,  $M = 5.30$ ) and the less desirable “chewy candy” ( $M = 3.83$ ),  $t(29) = 4.17$ ,  $p < .001$ .

Participants were approached in front of the main University cafeteria, which is located in the vicinity of a popular carnival spot. They were invited to taste one of two different candies, which were shown to them: a single piece of no-name chewy candy and a more desirable box of chocolate (*Nestlé Choco Crossies*). In the better-off neighbor condition, the experimenter pointed out that the taste tests would be conducted in pairs, pointed to another participant (a confederate), and explained that the products would be assigned randomly by drawing lots. Participants chose one of two paper slips, unfolded it, and read out loud what was written on it. Unbeknownst to them, both paper slips read “chewy candy.” Then the confederate unfolded the second paper slip and responded Choco Crossies. In the no-neighbor condition, participants were also assigned to taste the chewy candy (and not the chocolate) in the same way but were alone. To assess the intensity of their emotional response, all participants first rated how happy they were about receiving the chewy candy (reverse coded), then how angry they were about not receiving the box of chocolate, and finally how strongly they envied the participants who received the box of chocolate, on 10-point scales from 1 (*not at all*) to 10 (*extremely*). All responses were audio-recorded. The ratings were internally consistent ( $\alpha = .74$ ), and thus averaged to a single emotional response index. After having tasted the chewy candy, participants’ BAC was measured by an ACE3000 (ACE GmbH, Freilassing, Germany) breathalyzer. Before the measurement, participants rinsed their mouths with water to remove residual alcohol.

## Results and Discussion

We expected participants’ envious reactions to depend on their BAC as well as the immediate presence versus absence of a better-off other. The results depicted in Figure 1 are in line with this prediction: The more intoxicated participants were, the stronger was their negative emotional reaction toward the presence of a better-off neighbor (see Figure 1). BAC was correlated with the intensity of the negative emotional response in the better-off neighbor condition,  $r(19) = .62$ ,  $p = .01$ . In contrast, in the no-neighbor condition BAC was not related to the emotional response,  $r(19) = -0.16$ ,  $p = .50$ . This pattern corresponded to a significant neighbor  $\times$  BAC interaction,  $\beta = .62$ ,  $t(34) = 2.63$ ,  $p = .01$ , in a linear regression (main effects  $t_s < 1$ ).

These results provide initial support for our hypothesis that envious discontent is more pronounced when self-control is limited. When faced with another person with a superior good, participants reported more envious discontent the more alcohol they had consumed. This effect emerged, even though the advantage of the other person was merely a more desirable food that he or she was going to taste.

In the current experiment, differences in alcohol consumption “naturally occurring” in the field served as a proxy for participants’ tendency to exert self-control, attesting to the ecological validity of the findings. Nevertheless, it is important to show experimentally that diminished self-control leads to more intense envious behavior. Therefore, the following experiments were conducted in a more controlled laboratory setting. Furthermore, alcohol may have exacerbated envious responses because it affects

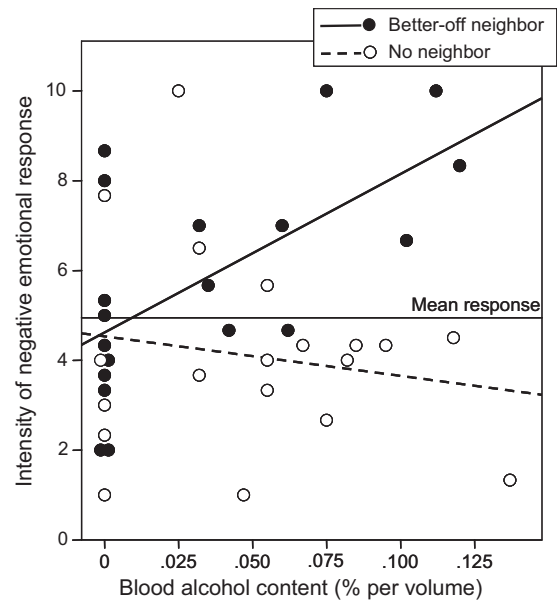


Figure 1. Intensity of participants’ negative emotional response after being deprived of a superior product (Experiment 1).

both the ability and the motivation to alter envious impulses. To influence participant’s ability to exert self-control more directly, we used a cognitive load manipulation in our remaining experiments. Experiment 2 was designed to examine whether the affective envious reactions that result from exposure to a better-off neighbor yield an intensified striving for the superior good. To do so, we assessed participants’ willingness to pay for this good.

## Experiment 2

Having established that spontaneous negative social comparisons lead to envious reactions under conditions that foster disinhibited responses, Experiment 2 explored whether an envy-inducing situation heightens the inclination to acquire the superior good. If becoming aware of a better-off other increases the valuation of the envied good, people should be willing to spend more money for the superior good, especially, when they are not able to control their envious reaction. To manipulate the participants’ residual mental resources, we used a cognitive load task. Cognitive load has been used frequently to foster impulsive responding in decision making and behavior (Frieze, Hofmann, & Wänke, 2008; Hinson, Jameson, & Whitney, 2003; Shiv & Fedorikhin, 1999; Ward & Mann, 2000) and has been shown to limit people’s capacity to control unwanted outcomes of spontaneous social comparisons (Gilbert et al., 1995).

We invited pairs of unacquainted participants to perform taste judgments in the laboratory. In the high load condition, participants had to remember a difficult 8-digit number. In the low load condition, this number was easy to remember. Participants in the better-off neighbor condition were assigned to taste a small package of butter biscuits (the inferior food), while their neighbor (who was in the worse-off-neighbor condition) was assigned to a more desirable ice-cream sundae (the superior food). Participants in the equal-neighbor condition were assigned to test both foods, as did

their partner—only in a different order. Before they tasted the foods, participants rated how strongly they envied their experimental partner and indicated their willingness to pay for each of the two products.

We predicted that participants should report most envy in response to a better-off other when they are under high cognitive load. These participants should also be willing to pay the most for the superior product. Furthermore, our reasoning holds that the expected differences in willingness to pay are associated with envy. Thus, we expected that the level of envy statistically mediates the effect of the neighbor condition on willingness to pay. Finally, because participants in the low load condition are likely to control their envious response, this relationship should be limited to participants in the high load condition.

## Method

**Participants and design.** Participants were 116 adults who were approached at a campus of the University of Cologne or recruited from an undergraduate participant pool. They were assigned to a 3 (neighbor: better-off vs. equal vs. worse-off)  $\times$  2 (cognitive load: high vs. low) between subjects design. Because all participants indicated their willingness to pay for the inferior as well as the superior food, the analysis of the willingness to pay data includes an additional 2 within subjects factor comprising 2 measures (food: inferior vs. superior). They received 4 Euro as compensation.

**Procedure.** Pairs of unacquainted participants were invited to participate in a study about “factors that affect product evaluations and taste judgments.” Upon arrival they were seated in front of two adjacent computers at a distance of about two meters. The computers were used to present the instructions and measures. To lend credibility to the ostensible goals of the study, participants were asked to indicate how much time had passed since their last meal. Furthermore, they rated the strength of their hunger, of their thirst, and of their appetite for several categories of food. These data were not analyzed. Then, participants saw pictures of the two foods to be tasted and were asked to form an impression of them: A package of *Leibniz* butter biscuits and a more desirable sundae of *Häagen-Dazs* ice cream. In the pretest described in Experiment 1, “*Häagen-Dazs* ice cream” ( $M = 7.20$ ) was more desirable than “*Leibniz* butter biscuit” ( $M = 5.13$ ),  $t(29) = 4.15$ ,  $p = .001$ .

Participants proceeded with the cognitive load manipulation, introduced as a means to discover how attention affects food evaluation. In the high cognitive load condition, participants had to remember a difficult 8-digit number (“84734239”). In the low cognitive load condition, participants had to remember an easy 8-digit number (“11111111”). Next, participants were informed that for randomization purposes the products would be simultaneously assigned to both of them by the computer. The assignment was then shown to them in a short animation, in which they saw their own outcome and the outcome of their experimental partner displayed simultaneously on their individual computer screens. In the animation, the position of both foods alternated rapidly between the experimental partners until it stopped and revealed the final allocation.

In two thirds of the participant pairs, one participant was assigned to the biscuits and his or her experimental partner was assigned to the ice cream. Participants who were assigned to the

biscuits (and their experimental partner to the ice cream) were in the better-off neighbor condition. Participants who were assigned to the ice cream (and their experimental partner the biscuits) were in the worse-off neighbor condition. In another third of the participant pairs, both experimental partners were assigned to taste both the ice cream and the biscuits. In this third condition—the equal-neighbor condition—only the order of the taste tests of the two products varied between the two experimental partners, one tasting the biscuits first and then the ice cream, and the other one tasting the ice cream first and then the biscuits. (The order in which participants tasted the two products in this condition did not affect the dependent variables,  $F_s < 2.16$ ,  $p_s > .15$ .)

Then, participants were told that their preference is a factor that affects taste judgments and that they should think about how they valued both products. To assess their envy, participants then indicated how strongly they envied their experimental partner on a 7-point scale from 1 (*not at all*) to 7 (*very much*). Next, they indicated the maximum amount of money they would be willing to pay for the ice cream and the biscuits if they had the opportunity to buy them. After tasting the foods and writing down the 8-digit number, participants were thanked and paid.

## Results and Discussion

**Envy.** We hypothesized that envious reactions should be most likely when resources to exert self-control are taxed. The means shown in Figure 2 are consistent with this reasoning. Within the high load condition, participants who had a better-off neighbor reported more envy ( $M = 3.53$ ) than participants with equal ( $M = 1.73$ ) and worse-off ( $M = 1.72$ ) neighbors, which was confirmed by a planned contrast comparing the better-off neighbor condition with the other neighbor conditions,  $F(1, 110) = 21.20$ ,  $p < .001$ . In contrast, under low load, envy of participants with a better-off neighbor did not differ from the other neighbor conditions,  $F(1, 110) = 2.03$ ,  $p = .16$ . Furthermore, high load participants with a better-off neighbor also reported more envy ( $M = 3.53$ ) than low load participants with a better-off neighbor ( $M = 2.28$ ),  $F(1, 110) = 7.33$ ,  $p < .01$ . Qualifying a neighbor condition main effect,  $F(2, 110) = 9.59$ ,  $p < .001$ , and a trend of a cognitive load main

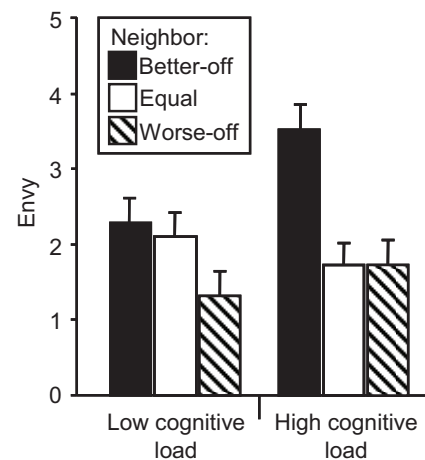


Figure 2. Mean envy toward neighboring participant (Experiment 2). Error bars indicate the SEM.

effect,  $F(2, 110) = 2.68, p = .10$ , the predicted two-way interaction was significant,  $F(2, 110) = 3.28, p = .04, \eta_p^2 = .06$ , in a 3 (neighbor: better-off vs. equal vs. worse-off)  $\times$  2 (cognitive load: high vs. low) analysis of variance (ANOVA).

**Willingness to pay.** We expected that an envy-eliciting situation increases inclination to acquire another person's superior possession, but only when self-control resources are taxed. The means depicted in Figure 3 are in line with these hypotheses. Within the high load condition, participants who had a better-off neighbor expressed a higher willingness to pay for the superior ice cream ( $M = 5.06$  Euro) than participants with equal ( $M = 2.38$  Euro) and worse-off ( $M = 1.84$  Euro) neighbors. This was confirmed by a planned contrast comparing the better-off neighbor condition with the other neighbor conditions,  $F(1, 110) = 7.46, p = .01$ . In contrast, under low load, willingness to pay of participants with a better-off neighbor did not differ from the other neighbor conditions ( $F < 1$ ). Furthermore, high load participants with a better-off neighbor were willing to pay more for the superior ice cream ( $M = 5.06$  Euro) than low load participants with a better-off neighbor ( $M = 1.67$  Euro),  $F(1, 110) = 7.11, p = .01$ . Apart from a food main effect,  $F(1, 110) = 33.21, p < .001$  and a marginal, lower order neighbor  $\times$  load interaction,  $F(2, 110) = 2.67, p = .07$ , the predicted three-way interaction was significant in a 3 (neighbor: better-off vs. equal vs. worse-off)  $\times$  2 (cognitive load: high vs. low)  $\times$  2 (food: inferior vs. superior) repeated measures ANOVA,  $F(2, 110) = 3.49, p = .03, \eta_p^2 = .06$ . No other effects emerged,  $F_s < 1.92, p_s > .17$ .

**Mediated moderation analysis.** Our reasoning holds that the joint effect of a better-off neighbor and high cognitive load on the willingness to pay for the superior food is associated with the level of reported envy. To examine this possibility, we conducted a mediated moderation analysis (Muller, Judd, & Yzerbyt, 2005). To this end, we regressed willingness to pay on contrast coded neighbor condition (better-off = 2, equal = -1, worse-off = -1), load (high = 1, low = -1), and the neighbor  $\times$  load interaction, revealing an effect of the interaction,  $\beta = .23, t(112) = 2.51, p = .01$ ; main effects  $t_s < 1.32$ . Then, we regressed envy on neighbor, load and the neighbor  $\times$  load interaction, revealing a main effect of neighbor,  $\beta = .39, t(112) = 4.21, p < .001$ , no effect of load,  $t(112) = 1.61, p = .11$ , and a neighbor  $\times$  load interaction,  $\beta = .21, t(112) = 2.22, p = .03$ . Finally, we again regressed willingness to

pay on neighbor, load and the neighbor  $\times$  load interaction, but adding envy and the envy  $\times$  load interaction as predictors. This equation produced only a significant effect of envy,  $\beta = .28, t(110) = 2.82, p = .01$ . Importantly, the effect of the neighbor  $\times$  load interaction was reduced and rendered nonsignificant,  $\beta = .13, t(110) = 1.38, p = .17$ ; other effects  $t_s < 1.22$ . This indicates that envy statistically mediated the joint effect of neighbor and load on the willingness to pay for the superior product. To elucidate these findings, we computed the indirect effects at high and low load. Envy statistically mediated the effect of the neighbor conditions under high load (Sobel  $z = 2.38, p = .02$ ), but not under low load (Sobel  $z = .77, p = .44$ ).

The results of Experiment 2 extend those of Experiment 1 in at least three important ways. First, they show that a cognitive load manipulation that more directly targets the ability to exert self-control affects the reported level of envy in much the same way as the less specific influence of alcohol intoxication. Second, these findings demonstrate that exposure to a better-off other not only influences participants' affective reactions, but also their willingness to pay for the superior product. Third, these latter effects were associated with the reported level of envy. Building on these insights, Experiment 3 was designed to take a closer look at how an envy-inducing situation influences buying behavior.

### Experiment 3

In particular, to provide direct evidence that an envy-inducing situation increases striving for the superior product when mental capacity is constrained, we assessed actual spontaneous buying behavior. We expected more purchases of the superior product when a better-off neighbor was present.

Experiments 1 and 2 have provided clear empirical evidence demonstrating that overt envious reactions occur only when self-control capacities are limited. Building on these findings, Experiment 3 focused explicitly on these critical conditions of taxed self-control. Specifically, all participants were put under high cognitive load so that all were under conditions in which envious reactions could potentially become apparent. In the crucial experimental condition, participants experienced a better-off neighbor whereas in the control condition no neighbor was present (as in Experiment 1). Participants in the better-off neighbor condition were assigned to taste an undesirable sauerkraut juice, while their neighbor (a confederate) was assigned to taste a more desirable fruit smoothie. Participants in the no-neighbor condition were also assigned to taste the sauerkraut juice (and were deprived of the smoothie) but were alone.

Subsequently, all participants were offered to purchase the more desirable food. To avoid reactivity issues, we took care to give participants the impression that this sale was purely coincidental and unrelated to the aims of the study. Additionally, we wanted to rule out the possibility that we alter participants' emotional state by measuring or alluding to envy (e.g., Larsen & Fredrickson, 1999; Schwarz, 1999), potentially contributing to a heightened purchase inclination. Hence, we did not include a self-report envy measure and thus made no reference to envy in the study materials.

### Method

**Participants and design.** Participants were 53 adults who were recruited at a campus of the University of Cologne. Follow-

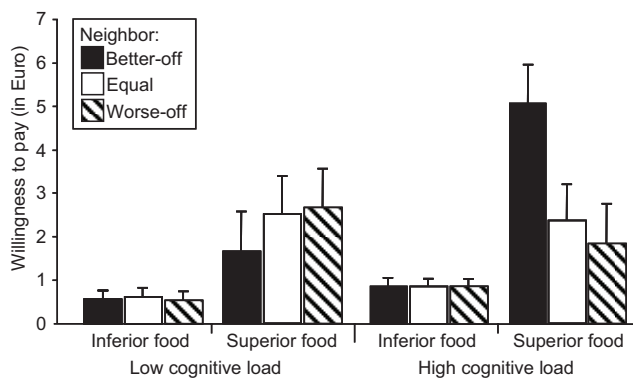


Figure 3. Mean willingness to pay for the inferior food and the superior food (Experiment 2). Error bars indicate the SEM.

ing up on Experiment 2, all of them were given the high cognitive load task. About half of them were assigned to a better-off neighbor condition; the other half was assigned to a no-neighbor condition. They participated in exchange for a 10% chance to win 10 Euro in a lottery.

**Procedure.** Initial procedures were identical to those used in Experiment 2. However, a different pair of foods was presented: sauerkraut juice (*Alnatura Sauerkrautsaft*) and a fruit smoothie (*True Fruits Smoothie*). In the pretest described in Experiment 1, “smoothie” ( $M = 5.43$ ) was judged to be more desirable than “sauerkraut juice” ( $M = 1.93$ )  $t(27) = 7.19, p < .001$ . Participants proceeded with the high cognitive load task as in Experiment 2. Then, the food was assigned as in Experiment 2, but implementing the experimental conditions of Experiment 1. In the better-off neighbor condition, the computer ostensibly assigned the sauerkraut juice to the participant and assigned the smoothie to a confederate—who pretended to be another participant. In the no-neighbor condition, the computer also assigned the sauerkraut juice (and not the smoothie) to the participant, but no other participant was present. Then, participants were led to another room where they were greeted by a second experimenter who was blind to experimental conditions. This experimenter remarked that the lab had accidentally purchased too many smoothies and offered the participant the opportunity to purchase a smoothie “at a price of 1.30 Euro instead of 2.30 Euro” (Xu & Wyer, 2008). Participants indicated whether they would or would not like to buy a smoothie at this price. Next, they wrote down the 8-digit number and proceeded with the taste test. At the end they participated in the lottery.

## Results and Discussion

We expected that being confronted with another person who is endowed with a superior good increases the inclination to purchase this good, when self-control resources are diminished. In line with these hypotheses, given the opportunity to spontaneously buy the superior product, participants who had a better-off neighbor were more likely to do so (48.0%), than those without a better-off neighbor (21.4%),  $\chi^2(1) = 4.16, p = .04, \phi = .28$ .

This finding demonstrates that exposure to a better-off other not only shapes participants’ affective expressions and reported willingness to buy the superior product, as is attested by Experiments 1 and 2. In addition, the same experimental situation also influences actual buying behavior. In line with our hypothesis, under conditions of taxed self-control, an envy-evoking situation led to more striving for a superior good, as indicated by participants’ increased tendency to buy this product. It is important to note that this experiment is silent with respect to participants’ emotional experience and the specific mechanism affecting their behavior. In isolation, the findings might also be seen as the result of relatively “cold” processes such as social modeling or nonconscious mimicry (e.g., Chartrand & Bargh, 1999). However, an almost identical procedure elicited envy in Experiments 1 and 2 that was related to an increased willingness to pay in Experiment 2. This suggests that it is plausible to interpret our findings as related to envy. Furthermore, Experiment 3 complements the results of Study 2 by showing a parallel effect on a behavioral measure that is unlikely to be affected by reactivity concerns.

## Experiment 4

The results of Experiments 2 and 3 demonstrate that envy is associated with an increased tendency to acquire the superior good of a neighbor under conditions of taxed capacity to exert self-control. Experiment 4 takes a closer look at the psychological mechanism that underlies this effect. More specifically, we seek to trace the impulsive behavioral consequences of envious reactions by examining participants’ motivational inclination to spontaneously approach the superior product.

To this end, we used an implicit measure of participants’ automatic tendency to approach versus avoid the envied product (Chen & Bargh, 1999). Such implicit measures can be used to assess preferences without having to rely on people’s willingness and ability to self-report, and they are considered to tap into impulsive precursors of behavior (Strack & Deutsch, 2004).

Participants had to respond as quickly as possible to pictorial stimuli by pushing or pulling a joystick. As the task was framed in a way that pulling the joystick toward oneself was associated with an approach movement and pushing the joystick away was associated with an avoidance movement, participants’ behavioral approach tendency toward the stimuli can be inferred from their reaction times (e.g., Seibt, Neumann, Nussinson, & Strack, 2008). In previous research, this measure has been shown to detect differences in motivational inclinations because of bodily need states such as the desire for food evoked by hunger (Seibt, Häfner, & Deutsch, 2007) and variation in sexual interest (Hofmann, Friese, & Gschwendner, 2009).

Participants were assigned to high and low load conditions. As in Experiment 3, participants were deprived of a more attractive food either in the presence of a better-off neighbor or not. Subsequently, participants completed the approach-avoidance task, in which they responded to pictures of the superior food, the inferior food, and neutral objects by pushing or pulling a joystick. Participants’ task was completely unrelated to the content of the stimuli: They had to classify the pictures according to their position on the screen. Because they also had to respond as quickly as possible within a narrow time window, their reaction times can be assumed to reflect automatic behavioral inclinations.

We predicted that under high load, the envy evoking situation results in an impulsive approach tendency toward the superior food of a neighboring participant. Under low load this should not occur, given that participants in this condition have the cognitive capacity to control their emotional response.

## Method

**Participants and design.** Participants were 96 visitors of the main cafeteria of the University of Cologne. They were assigned to a 2 (neighbor: better-off vs. none)  $\times$  2 (cognitive load: high vs. low)  $\times$  3 (stimulus: superior food vs. inferior food vs. neutral) mixed factorial design, with the first two factors manipulated between participants and the last factor manipulated within participants. They received 4 Euro as compensation.

**Procedure.** Participants first completed 32 practice trials of the approach-avoidance task. In each trial, one of several neutral pictures appeared on the upper or lower half of the computer screen. Participants were instructed to push or to pull the lever of a joystick in response to the vertical position of the stimulus (Seibt

et al., 2007). For example, participants had to push in response to stimuli appearing on the upper half and to pull in response to stimuli appearing on the lower half of the screen. Whether pushing (or pulling) was assigned to the upper (or lower) position was counterbalanced across participants. To enhance the association of the movements with approach and avoidance, participants were asked to “pull the objects toward you” and to “push the objects away from you” (Seibt et al., 2008). Furthermore, following the response, pulled and pushed stimuli increased or decreased in size, simulating distance change (Wentura, Rothermund, & Bak, 2000). To prompt spontaneous responses, we used a response window of 300 to 1,300 ms. If participants underran or overran the response window, they were reminded to wait for the stimulus or to respond faster. If participants moved the joystick in the wrong direction, they received an error message. Interstimulus interval (with blank screen) was 2,500 ms.

After they had completed the practice trials of the approach-avoidance task, the sauerkraut juice and the smoothie were presented to the participants. They proceeded with the load task, in which they were put under high or low load (see Experiment 2). Next, all participants were assigned to taste the sauerkraut juice. In the no-neighbor condition, participants were alone. In the better-off neighbor condition, a confederate was assigned to taste the smoothie (see Experiment 3).

Then, participants completed the four target blocks of the approach versus avoidance task. Within each block, a picture of the sauerkraut juice and a picture of the smoothie were presented twice on the upper half and twice on the lower half of the screen. Additionally, pictures of four neutral objects (a towel, a light bulb, a plant pot, and a chair) were presented once on the upper and once on the lower half of the screen, totaling 16 randomly ordered trials per block. Whether participants had to respond to stimuli appearing on the upper or lower half of the screen with pushing or pulling did not affect the predicted neighbor  $\times$  load  $\times$  stimulus interaction,  $F < 1$ ; therefore, all analyses were collapsed over this factor.

Having completed the approach-avoidance task, participants wrote down the 8-digit number. Then, they tasted the sauerkraut juice. Finally, they were thanked and paid.

## Results and Discussion

All error trials were discarded (2.0% of the data), along with all reaction times outside of the response window of 300 to 1,300 ms (3.1% of the data) and the remaining reaction times were log-transformed. For the sake of interpretability we report nontransformed means. Mean response latencies were computed separately for approach and avoidance trials within each stimulus category. For ease of presentation, the mean reaction time for approach trials was then subtracted from the mean reaction time of avoidance trials for each stimulus category. The resulting difference scores reflect the approach tendency toward the stimuli. The faster participants were in approaching the stimuli compared to avoiding the stimuli, the higher the score. Because the sphericity assumption of the repeated measures ANOVA analyzing the complete factorial design was not met, Mauchly's  $W = .90$ ,  $\chi^2(2) = 9.41$ ,  $p = .01$ , Greenhouse-Geisser correction ( $\epsilon = .91$ ) was used where appropriate. In addition to the overall ANOVA, we computed planned contrasts within the between subjects conditions to analyze the pattern of means.

We hypothesized that when participants' capacity to exert self control is constrained, an envy provoking situation results in an impulsive behavioral tendency to approach the envied product. This hypothesis holds that participants in the high load condition have a stronger automatic approach tendency toward the superior food when sitting next to a better-off neighbor. This, however, should not be the case if they are alone. The approach scores depicted in Figure 4 and planned contrasts within the experimental conditions are in line with these predictions. Compared to their approach tendency toward the neutral stimuli ( $M_{\text{neutral}} = 11.24$ ) and the inferior food ( $M_{\text{inferior}} = 2.08$ ), participants in the high

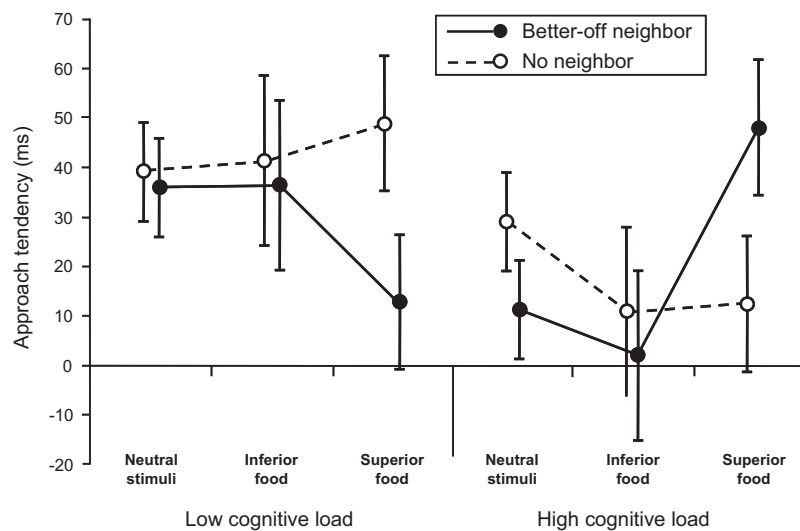


Figure 4. Mean approach tendency toward neutral objects, the inferior food, and the superior food (Experiment 4). The faster participants were in approaching the stimuli compared to avoiding the stimuli, the higher the score on the approach tendency score. Error bars indicate  $\pm 1$  SEM.



load condition had a stronger approach tendency toward the superior food ( $M_{\text{superior}} = 48.03$ ) when sitting next to a better-off neighbor,  $F(1, 22) = 7.66, p = .01$ , but not when they were alone ( $M_{\text{neutral}} = 28.98, M_{\text{inferior}} = 10.84, M_{\text{superior}} = 12.39$ ),  $F < 1$ . Interestingly, under low load, compared to their reaction toward neutral stimuli ( $M_{\text{neutral}} = 35.86$ ) and the inferior food ( $M_{\text{inferior}} = 36.44$ ), participants tended to approach the superior food ( $M_{\text{superior}} = 12.73$ ) less when a better-off neighbor was present,  $F(1, 24) = 3.86, p = .06$ . We interpret this result as a “sour grapes” effect: For low-load participants with a better-off neighbor, regulating their envious response may have led to a negative evaluation of the unattainable food, resulting in less approach behavior. Again, this difference did not emerge in the low load/no-neighbor condition ( $M_{\text{neutral}} = 39.11, M_{\text{inferior}} = 41.32, M_{\text{superior}} = 48.78$ ),  $F < 1$ .

The complete pattern of means resulted in the predicted three-way interaction in a 2 (neighbor: better-off vs. none)  $\times$  2 (cognitive load: high vs. low)  $\times$  3 (stimulus: inferior vs. superior vs. neutral) repeated measures ANOVA,  $F(1.82, 167.55) = 3.44, p = .04, \eta_p^2 = .04$ , qualifying a marginal load main effect,  $F(1, 92) = 3.16, p = .08$ . No other effects emerged,  $F_s < 1.90, p_s > .16$ .

The goal of Experiment 4 was to shed additional light on the psychological mechanisms that underlie the demonstrated affective and behavioral consequences of envy-eliciting situations. More specifically, we set out to show that when participants' capacity to exert self control is constrained, an envy provoking situation results in an impulsive approach tendency toward the envied product. Our results lend empirical support to this possibility. This finding extends those of Experiments 2 and 3 by demonstrating that the increased tendency to acquire the envied good is also apparent on the level of spontaneous approach behavior as assessed by an implicit measure. Thus, envy does not only shape complex behavioral outputs such as those underlying buying behavior but also more basic behavioral outputs like approach and avoidance.

## General Discussion

These four experiments provide support for the hypothesis that negative spontaneous social comparisons provoke envy and impulsive behavioral tendency to strive for the envied good. This is primarily the case under conditions of a taxed capacity to exert self-control. In all experiments, envy was elicited by depriving participants of a desirable food, while facing another participant (or confederate) who was asked to taste this food. Experiment 1 provided support for the hypothesis that envious discontent is most apparent among participants with constrained self-control. The greater participants' alcohol intoxication, the more dissatisfaction, anger, and envy they reported in response to not receiving a superior product. As predicted, this happened only when participants were in the presence of a better-off other, but not when they were alone. Replicating this basic effect with a direct cognitive manipulation of processing capacity, Experiment 2 demonstrated that participants who received butter biscuits rather than ice cream sundaes experienced more envy. Furthermore, these participants were willing to pay more for the superior good. This provides a first indication that envy is related to the extent to which people strive for a given product. Importantly, the level of envy was statistically associated with the effect of the envy-evoking situa-

tion on participants' willingness to pay for the more desirable good. Under identical conditions, Experiment 3's participants, who were asked to taste sauerkraut juice and not the more desirable fruit smoothie of their neighbor, were more inclined to spontaneously purchase the superior drink than were participants who also had been deprived of the smoothie, but did not face a better-off other. Finally, Experiment 4 demonstrated that envy-provoking situations elicit an impulsive behavioral approach tendency. Participants who were taxed by high cognitive load while facing a better-off neighbor were faster in approaching the superior stimulus in an implicit approach-avoidance measure than were those who participated alone. These results were specific to situations in which a particular, better-off coactor was present. They did not emerge when participants did not have a salient upward comparison standard, even though objectively, their allocation outcome was the same. Thus, taken together, these studies provide converging evidence for the notion that spontaneous social comparisons result in envious discontent and an impulsive approach tendency for the superior good of another person that affect behavior if the capacity to control envy is taxed.

Our findings help understand the intricacies of envy. They complement previous scholarly opinion and correlational evidence by showing experimentally that an envy evoking situation can indeed have a causal effect on the tendency to acquire the good that has elicited the emotion. Thus, our data confirm the conjecture that envy can have a tremendous impact on economic judgments and behavior. Furthermore, our findings demonstrate the impulsive nature of envious responding. First, envious behavior only emerged when participants were deprived of their cognitive resources. Second, the effect was apparent on an implicit measure of participants' motivational tendency. Thus, the consequences of an envy-provoking situation hinge on people's residual mental capacity. In light of the multiple demands on people's limited cognitive capacities, spontaneous envious reactions are often likely to surface.

Our results are in line with the notion that people's attempts to cope with their emotional reaction are crucial to comprehend envy (Smith & Kim, 2007). While not the focus of the present research, it is interesting to speculate what exactly happened in the experimental conditions in which participants were not deprived of their ability to exert self-control. Did those participants experience less envy or did they just not publicly acknowledge and report their emotion? Possibly, intoxicated and high-load participants were merely more emotionally expressive because they were less motivated or less able to think about the negative implications of acknowledging their envy. This corresponds to the question of how participants regulated their emotion. An influential framework of emotion regulation (Gross, 1998) distinguishes antecedent-focused from response-focused forms of emotion regulation. Suppressing overt envious responses is a response-focused form of emotion regulation. Alternatively, participants may have engaged in (antecedent-focused) reappraisal of the envy eliciting situation. A finding that might suggest that the latter mechanism was (at least partially) at work in the present experiments is present in Experiment 4. In this experiment, low cognitive load participants showed some indication of reduced approach behavior toward the superior food of their neighbor—a finding that is unlikely to be because of the wish to suppress overt envious reactions. A more plausible interpretation of this result is that coping with envious

responses involved a cognitive devaluation of the desirable possession of the better-off neighbor (i.e., a “sour grapes” effect). The fact that the metaphor “sour grapes” is frequently misused as a synonym for envy (Garner, 1998) might point to the importance of this phenomenon in such situations. One way to achieve such a strategic devaluation is to seek negative attributes of the originally superior fortune. For example, our participants may have reminded themselves of the fact that—while being delicious—smoothies contain very high levels of fruit acids and sugar and may thus damage their teeth and be detrimental to their dietary goals.

Some research indicates that emotion regulation through reappraisal does not consume cognitive resources (Richards & Gross, 2000). Importantly, however, this research differs from the present studies in that participants were explicitly instructed how to respond to emotional stimuli before encountering them. In contrast, participants in the present study did not expect an emotional situation and suddenly had to cope with an inferior outcome. Thus, rather than being able to differently construe the situation before encountering it, they probably had to cope with their emotional response while it was already underway. Such an “online” form of reappraisal has been shown to be more resource demanding (Sheppes & Meiran, 2008).

We think that the most plausible explanation for finding reduced envy and desire among sober and low load participants is that they spontaneously engaged in active self-regulation. Nevertheless, it is important to note that the current experiments provide only indirect evidence for this account and our data remain open to alternative explanations. For example, our findings could also be interpreted from the perspective of alcohol and attentional myopia models (Mann & Ward, 2004; Steele & Josephs, 1990). According to these models, unconstrained participants may have been less affected by the envy-inducing situation because their attention was relatively less focused on the salient disinhibitory social comparison information and more focused on peripheral inhibitory cues reminding them of the norm to respond without envy.

One could also question the motives that lead unconstrained participants to refrain from acting enviously. We arrived at the prediction that envious discontent and desire should be restricted to taxed participants because envy is usually considered to be a particularly painful, self-threatening, and socially sanctioned emotion, making spontaneous self-control attempts especially likely (Smith & Kim, 2007). However, to express emotions and to follow one’s impulses has also been argued to be a taboo to some extent (Ekman, 1972; Miceli & Castelfranchi, 2003) and our findings could be regarded as the result of this general tendency. Whether envy is more strongly associated with spontaneous self-control than other (negative) emotions remains of course open to future investigation. Future research may also investigate more closely the specific mechanisms leading to successful self-control in envy-evoking situations and which consequences for judgment and decision-making these strategies entail.

Our finding that approach-avoidance behavior is influenced differently by upward comparison standards when processing capacity is high or low dovetails with mounting evidence from attitudinal research that impulsive responding can be highly flexible. For example, it has been shown that situational needs and motivations of individuals affect diverse phenomena such as the automatic operation of prejudice (Sinclair & Kunda, 1999; Spencer, Fein, Wolfe, Fong, & Duinn, 1998) or impulsive influences on

the evaluation of consumables (Seibt et al., 2007). In addition, deliberate cognitions can alter the accessibility of associative contents within the impulsive system (Strack, Werth, & Deutsch, 2006). Thus, the impulsive orientation toward a stimulus may not only be affected by current needs, it may also be influenced by how the stimulus is mentally construed in a given situation and can thus be susceptible to emotional reappraisal strategies.

According to previous research, envy should be restricted to situations in which people become aware of others’ superior objects and characteristics that are highly self-relevant (Bers & Rodin, 1984; Salovey & Rodin, 1984; Silver & Sabini, 1978). Notably, however, the present results were obtained even though the event that triggered envy seems quite miniscule: another person tasted a somewhat more desirable food. Still, when self-control capacity was low, participants reacted with envy. This finding supports the view that envy is a basic and spontaneous response to superior others, that results even if the reason for their superiority is of limited self-relevance. Of course, many material possessions such as luxury goods and expensive brand commodities are more strongly tied to perceptions of people’s social status and their identity (Belk, 1988; Frank, 1999). It is reasonable to assume that envy in response to others who are superior in terms of a self-definitional characteristic or by possessing a good that is highly self-relevant is more difficult to control. Not only because the resulting emotion may be more intense, but also because the perceived differences are more difficult to reappraise.

The current studies focused on a relatively benign side of envy—an increased motivation to gain the superior goods that others have and to improve one’s own position. While not implying socially malicious consequences by itself, this consequence of envy may of course be a mixed blessing. On the one hand, it might contribute to individual advancement by better performance (Schaubroeck & Lam, 2004) and, in the long term, to economic growth (Corneo & Jeanne, 2001). On the other hand, it might be associated with increased materialism (Richins, 1995) and other detrimental effects to society (Frank, 1999). Finally, because malicious envy might be “what emulative envy may become under certain conditions” (Rawls, 1971, p. 467), a fruitful avenue for future research is to explore the determinants of whether spontaneous envy stays focused on the superior good or results in malicious ill will against the person enjoying the advantage (Van de Ven et al., 2009).

On a more mundane level, the present findings may help us understand why becoming aware of others’ superior dinner choices post aperitif can be such a painful experience. In addition, we hope that our findings contribute to our knowledge of how and when emotion and impulsive responses influence peoples’ judgments and decisions. If mental capacity is constrained, envy may be associated with objectively unjustifiable overvaluations of products and options that others have and may thus fuel irrationality in human decision making.

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